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7590

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EXAMINER

ALEJANDRO, RAYMOND

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 08/21/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/005,000

Applicant(s)

LEE ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Applicant's claim for domestic priority under 35 U.S.C. 120 is acknowledged.

Drawings

2. The sheets of drawings, filed on 12/07/01 have been accepted.

Claim Objections

3. Claim 7 is objected to because of the following informalities: the recitation "has reached at predetermined temperature" should be changed to "has reached a predetermined temperature".
Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
6. Claims 1 and 4 recites the limitation "the working fluid" in lines 9. There is insufficient antecedent basis for this limitation in the claim. Since both claims 1 and 4 recite "a liquid working fluid" and "a gas", it is unclear as to what is particular "working fluid gas" the present claims are intended to recite.

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7. The language "expanding the through" in claim 4 is unclear, thereby rendering the scope of the claim indefinite. It appears the claim language has missing text (i.e. term, word, phrase), thereby it does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1, 3-4, 6-7 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugita et al 4820594.

The present application is directed to processes wherein the disclosed inventive concept comprises the specific pumping; heating, expanding and energy using/removing steps. Other limitations includes using the shaft work to drive a pump; and the organic based fluid.

With respect to claims 1, 4 and 7:

Sugita et al disclose the following (CLAIM 17):

17. A method of starting a fuel cell power generation system, comprising:

a first stage including the steps of filling a reforming part of a reformer with inert gas; and filling a fuel cell with inert gas, wherein said reformer and said fuel cell are connected by a pipe line;

60 a second stage including the steps of starting a drive assembly comprising a compressor, a combustor, a turbine and a generator by feeding air from said compressor to said combustor; feeding fuel to said reformer reforming part and from said reformer reforming part to said combustor; and engaging a clutch of said drive assembly when said compressor, said turbine and said generator have attained a predetermined rotating speed;

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- a third stage including the steps of feeding a high-temperature combustion exhaust gas produced by said drive assembly to a waste heat boiler; feeding water to said waste heat boiler; generating steam in said waste heat boiler; and feeding steam generated in said waste heat boiler to said reformer reforming part where it is mixed with fuel fed to said reformer reforming part;
- a fourth stage including the steps of feeding fuel and steam from said reformer reforming part to an anode of said fuel cell; feeding air to a cathode of said fuel cell; and feeding air from said compressor to a reformer combustion part;
- a fifth stage including the steps of elevating the temperature of said anode by elevating the temperature of said fuel and steam fed to said anode from said reformer reforming part, by in turn elevating the temperature of said reformer reforming part by combusting said air fed to said reformer combustion part from said compressor; elevating the tem-

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- perature of said cathode by feeding a high-temperature combustion gas to said cathode from said reformer combustion part and by feeding air to said cathode from said compressor of said drive assembly; recycling a portion of gas exiting said cathode; and feeding a remainder of gas exiting said cathode to said combustor of said drive assembly; and
- a sixth stage including the steps of attaining an operational temperature in said reformer and said fuel cell; reducing said feed of fuel from said reformer reforming part to said combustor of said drive assembly; reducing said feed of air from said compressor to said combustor of said drive assembly; and stopping combustion in said combustor of said drive assembly.
18. A method of starting a fuel cell power generation system according to claim 17, wherein said fuel is natural gas, LPG, methanol or gas oil.

* * * * *

Sugita et al disclose a fuel cell system wherein fuel is used directly as a heating medium for raising the temperature of the system (ABSTRACT). **Figure 1** below shows the fuel cell system comprising a pump 109 which is connected to the waste heat boiler 120 which transfer heat to the water to create steam wherein the heat waster boiler 120 is further connected to the inlet part of the reformer 101 (COL 3, lines 34-42). The fuel cell system comprises the fuel cell 102; the air compressor 116, the turbine 118, the heat boiler 120 (COL 2, lines 53-57).

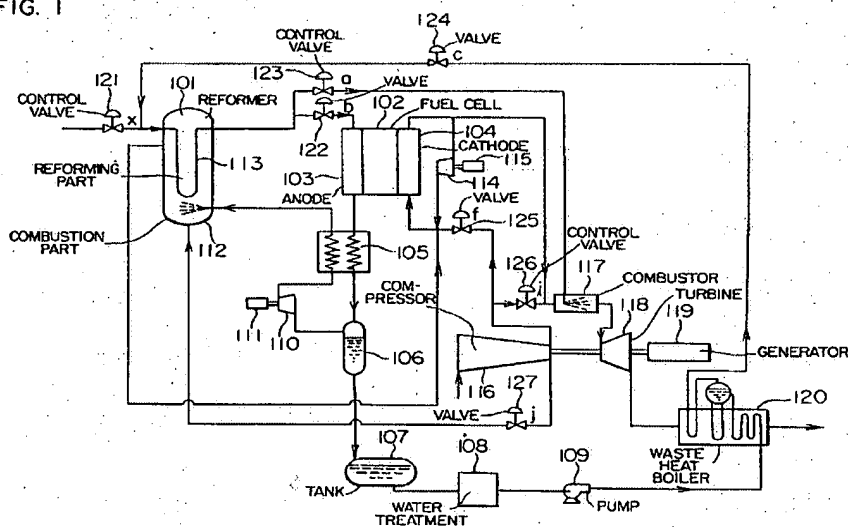
It is also evident from **Figure 1** that the fuel cell is connected to an expander (turbine 118), thereby delivering the exhaust to the expander. The compressor 116, the turbine 118 and generator 119 are connected with the same power system which is further connected through a clutch with a drive assembly to deliver work (COL 3, lines 14-22). Figure 1 also depicts that the expander is connected to another fuel cell component to use the generated work.

Figure 1 also illustrates that the expander (turbine 118) is in flow communication (connected) with fuel cell through the reformer 101 wherein the fuel cell anode outlet is

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connected to the heat exchanger 105 and the outlet of heat exchanger is connected to the drum 106 (COL 3, lines 1-11) where they cool the anode outlet exhaust (COL 5, lines 1-10). Thus, both the heat exchanger 105 and the drum 106 act as a condenser by recovering constituent of the anode gas exhaust. Thereafter, the separated water enters water tank 107, then brought to elevated pressure and sent to the waste heat boiler 102 by means of the feed water pump 109 (COL 5, lines 55-62).

FIG. 1



On the matter of claims 3, 6 and 9:

It is disclosed that the fuel is directly used as heating medium (ABSTRACT/COL 1, lines 59-65) wherein the fuel includes at least methanol, LPG and gas oil (CLAIM 18):

18. A method of starting a fuel cell power generation system according to claim 17, wherein said fuel is natural gas, LPG, methanol or gas oil.

* * * * *

Thus, the claims are anticipated.

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Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 2, 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita et al 4820594 as applied to claims 1, 4 and 7 above, and further in view of LaPierre et al 6348278.

Sugita et al are applied, argued and incorporated herein for the reasons above. However, Sugita et al do not disclose using the shaft work to drive a pump.

LaPierre et al disclose that in addition to using the heat released in cooling streams and combusting the exhaust tail gas stream 48, it is possible to use the energy of expanding gases to operate other devices in the system such as pumps, turbines or blowers (COL 15, lines 34-50). Particularly, the energy from the combustion exhaust gas expander 130 could also be used to

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operate pumps (COL 15, lines 43-45). La Pierre et al teach that the their integrated system is also particularly suited for starting-up fuel cell systems (COL 16, lines 12-20).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the shaft work to drive a pump of LaPierre et al in the fuel cell system of Sugita et al as LaPierre et al disclose that in addition to using the heat released in cooling streams and combusting the exhaust tail gas stream, it is possible to use the energy of expanding gases to operate other devices in the system such as pumps, turbines or blowers. Thus, an energy efficient system is obtained because the energy from the combustion exhaust gas expander is fully utilized to operate additional-ancillary devices for supporting fuel cell operations which are necessary to convert chemical energy of a reaction into electrical energy. *Furthermore, it is noted that LaPierre et al clearly envision to use the foregoing shaft work during start-up conditions as La Pierre et al teach that the their integrated system is also particularly suited for starting-up fuel cell systems.*

Double Patenting

13. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

14. Claims 1, 4 and 7 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 21-22 of copending Application No. 10/005928. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The copending application'928 claims a process comprising heating a fuel cell stack during cold startup conditions including: pumping a cooling fluid including a liquid to an elevated pressure, transferring thermal energy from the cooling fluid to the fuel cell stack, and repeating the above steps for heating a fuel cell stack during cold startup conditions until the temperature of the fuel cell stack has reached a temperature for operating the fuel cell under post-startup conditions and wherein the operation of the fuel cell stack produces waste heat (CLAIM 21) wherein the step of heating a fuel cell stack during cold startup conditions further comprises: heating the cooling fluid with a second heat source to change the liquid to a gas, expanding the heated cooling fluid in an expander to produce shaft work, driving an air compressor with the shaft work to compress air and delivering the compressed air to the fuel cell stack, directing the cooling fluid through a condenser having a condenser fans and wherein the condenser fans are turned off (CLAIM 22).

In this case, the instant application claim is broader or more generic than the claim of the copending application'928, thus, the instant application claim is anticipated by the claim of the copending application'928. Accordingly, a broad limitation is anticipated by a narrow limitation which lies within the broad limitation. *In re Goodman*.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
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